CHAPTER 17

Study Guide

17.1 The Flow of Energy—Heat and Work

- Heat always flows from a warmer object to a cooler object.
- A system gains heat in an endothermic process, and loses heat in an exothermic process.
- Heat flow is measured with two common units, the calorie and the joule.
- The heat capacity of an object depends on both its mass and its chemical composition.

➔ The specific heat is the heat capacity of an object Divided by its mass

17.2 Measuring and Expressing Enthalpy Changes

- In calorimetry, the heat released by a system equals the heat absorbed by its surroundings. Conversely, the heat absorbed by a system equals the heat released by its surroundings.
- The enthalpy change for a reaction can be treated like any other reactant or product.

Heat in Changes of State

- The heat absorbed by a melting solid is exactly the same as the heat lost when the liquid solidifies; that is, $\Delta H_{fus} = -\Delta H_{solid}$.
- The heat absorbed by a vaporizing liquid is exactly the same as the heat lost when the vapor condenses; that is, $\Delta H_{vap} = -\Delta H_{cond}$.
- Heat is either released or absorbed during the formation of a solution.

17.4 Calculating Heats of Reaction

- You can calculate the heat of a reaction by applying Hess's law of heat summation or by using standard heats of formation.

Formulas that we have worked with

q=mcΔt q=vcΔt

ΔH=nH

ΔEtotal=q + ΔH + q + …

q=ΔH nH= mcΔt nH=vcΔt

nH=CΔt

✓ →types of calculations:

- ®Heat flow
- ®Enthalpy(energy) change for phase changes, chemical changes and dissolving
- ®Heating or cooling curves
- ®Thermochemical equations
- ®Calorimeter calculations
- ®Hess's Law
- ®Finding energy change using a table of Hf values
- ®thermochemical equations combined with quantities or that use the table of Hf first
- ®Calorimeter type calculations combined with heat use or production

Page 535-539 Lots of practise answers for odd#'s start on R97(back of text) The wiki has a practise worksheet designed by one of my former student interns.

This test has a great deal of calculation and includes Ch 17 from your text as well as a lot of supplementary work from your notes and the problem handout.

Format: Multiple Choice, problems, short answer

Vocabulary

- calorimeter (p. 511)
- calorimetry (p. 511)
- chemical potential energy (p. 505)
- endothermic process (p. 506)
- enthalpy (p. 511)
- exothermic process (p. 506)
- heat (p. 505)
- heat capacity (p. 508)
- heat of combustion (p. 517)
- heat of reaction (p. 514)
- Hess's law of heat summation (p. 527)
- law of conservation of energy (p. 506)
- molar heat of condensation (p. 523)
- molar heat of fusion (p. 520)
- molar heat of solidification (p. 520)
- molar heat of solution (p. 525)
- molar heat of vaporization (p. 522)
- specific heat (p. 508)
- standard heat of formation (p. 530)
- surroundings (p. 506)
- system (p. 506)
- thermochemical equation (p. 514)
- thermochemistry (p. 505)

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